

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NITK – Surathkal

CS204: Data Structures and Algorithms Lab

Assignment - 6

Instructions:

1. Implement the following exercise using C.
2. You are required to complete this exercise on or before 14/12/2021.
3. Submit all the programs in a single .zip file.

Exercise:

1. Write a program to implement the following operations on a graph G using the BFS algorithm (Each node contains an integer type data).
 - a. Insert(): This function adds a node to the graph using an adjacency matrix.
 - b. BFS_Display(): Prints all the nodes reachable from a given starting node in a graph using BFS
 - c. BFS_Search(): Searches for a key element in the tree. Also, displays the path to the search of the key.
 - d. BFS_Connect(): Checks whether a given graph is connected or not.
2. Write a program to implement the following operations on Graph G using the DFS algorithm (Each node contains an integer type data).
 - a. Insert(): This function adds a node to the graph using an adjacency list.
 - b. DFS_Display(): Prints all the nodes reachable in a graph using DFS
 - c. DFS_Search(): Searches for a key element in the tree. Also, displays the path to the search of the key.
 - d. DFS_Connect(): Checks whether a given graph is connected or not.
3. Write a program to implement the topological sorting algorithm on a Directed Acyclic Graph.
4. Write a program to check whether a given directed graph is strongly connected or not.
5. Given a weighted, undirected, and connected graph G, write a program to find the minimum spanning tree (MST) G' for G using
 - a. Prim's algorithm
 - b. Kruskal's algorithm

The programs should print the edges in the MST and their corresponding weights and the total minimum cost.

6. Given a weighted, undirected, and connected graph G and a vertex v , write a program that can find the shortest paths from vertex v to every vertices in G using:
 - a. Dijkstra's Algorithm
 - b. Bellman-Ford Algorithm